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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/873,931	06/04/2001	Robert D. Horning	H16-16009 US	4429
7590 John G. Shudy, Jr. Patent Services Honeywell International Inc. 101 Colombia Road Morristown, NJ 07962		05/29/2007	EXAMINER RAO, SHRINIVAS H	
			ART UNIT 2814	PAPER NUMBER
			MAIL DATE 05/29/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

09/873,931

Applicant(s)

HORNING ET AL.

Examiner

Steven H. Rao

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 15 March 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 19-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) 19-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

***Response to Amendment***

Applicants' amendment filed on March 09, 2007 has entered and forwarded to the examiner on March 15, 2007.

Therefore claims 19 –27 as recited in the amendment of March 09, 2007 are currently pending in the Application.

Claims 1 to 18 and 28-36 are cancelled.

**Claim Rejections. 35 USC § 112**

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 19- 27 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.

The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

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Claim 19 as amended recites in line 5 "placing only a single strain compensated p+ layer on the first side of the substrate".

The recitation "only a single strain compensated p+ layer" was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

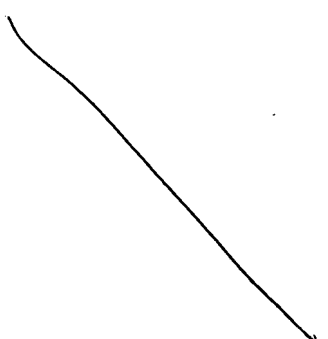
The Examiner could only find relevant description of strain layer in para 013 and 0016 which state :

"Germanium is isoelectronic with silicon. Strain compensated layers as thin as one thousand .ANGstroms and as thick as several tens of microns are contemplated. "

As is clear from the above the specification describes only "Layers" in plural and not singular, therefore the description of a single strain compensated p+ layer is not seen.

Applicants' response after full consideration is not persuasive ( see below) .

Dependent claims 20-27 are rejected at least for depending upon rejected independent claim 19.



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***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 19 to 21 are rejected under 35 U.S.C. 102(e) as being anticipated by Wu et al. ( U.S. Patent No. 6,689,211 herein after Wu).

With respect to claim 19 Wu describes a device produced to the method of making a silicon micromechanical structure, comprising the steps of: forming a lightly doped silicon substrate having a first and second side (Wu fig.1 D substrate #132) and having less than  $5 \times 10^{19} \text{ cm}^{-3}$  boron therein ( Wu co1.4 line 29); placing ( only a single) a strain compensated p+ layer on the first side of said substrate by doping with boron and germanium to form an etch stop ( Wu figure 1 D 134 over 132, claims 1, 2).

The limitation "only a single strain compensated p+ layer is new mater for reasons set out above and cannot be given patentable weight.

Assuming arguendo that Applicants' are some how able to over come the new matter rejection of the recitation "( only a single) a strain compensated p+ layer on the first side of said substrate by doping with boron and germanium

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to form an etch stop" it is noted for the record that the alternate use of single/multiple etch stop layer is conventional and well known in the art as seen at least from U.S. Paten No. 5,906,706 ( Robinson et al.) .

The remaining limitations of claim 19 are :

said p+ having a boron content of greater than  $7 \times 10^{19} \text{ cm}^{-3}$  (Wu col.4 lines 35) and a germanium content of no more than about  $1 \times 10^{21} \text{ cm}^{-3}$  (Wu col. 10 lines 50-55) ; forming a mask on the second side for etching a predetermined pattern ( Wu col. 8 lines 65, 33-37, etc.) ; etching said second side to said p+ layer to form a silicon diaphragm ( Wu col. 2 lines 22 to 50, col. 1 line 19-20) ; depositing an insulator on said p+ layer ( Wu figs. 10-11F ) and fabricating an electronic component as an micromechanical structure on said insulator. (co1.1 lines 13 to 30).

With respect to claim 20 Wu describes the device of claim 19, wherein said boron content is greater than  $1 \times 10^{20} \text{ cm}^{-3}$  (WU claims ) and the germanium content is from about  $0.5 \times 10^{21} \text{ cm}^{-3}$  to about  $2.0 \times 10^{21} \text{ cm}^{-3}$ . ( Wu col. 10 lines 50-55, figure 8 etc.)

With respect to Claim 21 Wu describes the device of claim 19, wherein said micromechanical structure is a pressure sensor. ( Wu col. 1 lines 15-20)

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

A. Claims 22, 24 -27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wu et al. ( U.S. Patent No. 6,689,211, herein after Wu) as applied to claims 19-22 above and further in view of Stemme et al. ( U.S. Patent No. 6,546,084, herein after Stemme).

With respect to claim 22 Wu ( col. 1 lines 19-22 etc.) describes the device of claim 21, wherein said electronic component is selected from the group consisting of resonant microbeams, but does not specifically describe a dielectrically isolated piezoresistors

However Stemme, a patent from the same filed of endeavor, describes in Co1.4 lines 11-12 and col. 7 lines line 14, etc. describes an electronic component is selected from the group consisting of dielectrically isolated piezoresistors and resonant microbeams to form Ultraminiaturized sensors having high sensitvty in a cost effective manner.

Therefore it would have been obvious to one of ordinary skill in the art at the

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time of the invention to specify Stemme's dielectrically isolated piezoresistors and resonant microbeams for the unspecified sensors of Wu in Wu's device to form Ultraminiaturized sensors having high sensitivity in a cost effective manner. ( Stemme col. 2 lines 38-48).

With respect to claim 24 describes the device of claim 23, wherein said electronic component is selected from the group consisting of dielectrically isolated piezoresistors and resonant microbeams. ( Stemme col.4 lines 11-12 and col. 7 line 14).

With respect to claim 25 describes the device of claim 19, wherein said micromechanical structure is a dual web biplane accelerometer formed by forming a said p+ layer on both sides of said substrate, forming a proof mask and flexure etching on both sides of said layer until said etching reaches said p+ layers.

With respect to claim 26 Wu describes the device of claim 25, wherein said electronic component is selected from the group consisting of dielectrically isolated piezoresistors and resonant microbeams. ( Stemme col.4 lines 11-12 and col. 7 line 14).

With respect to claim 27 Wu describes the device of claim 19, wherein said micromechanical structure includes a dielectrically isolated piezoresistor formed on a top surface of a first wafer, a second wafer is bonded to said first



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wafer, and said second wafer forms a single crystal piezoresistor.( Stemme fig. 16 and col. 2 lines20-36 ).

B. Claim 23 is rejected Wu et al. ( U.S. Patent No. 6,689,211, herein after Wu) and Stemme et al. ( U.S. Patent No. 6,546,084, herein after Stemme) as applied above and further in view of Nilsson et al. ( U.S. Patent No. 6,252,335, herein after Nilsson).

With respect to claim 23 Wu and Steeme describe the device of claim 19, wherein said micromechanical structure. Wu and Stemme do not specifically describe a cantilevered accelerometer.( Nilsson abstract line 1).

However Nilsson in its abstract line 1, etc. describes a cantilevered beam accelerometer to obtain a beam sensor that is small, very sensitive but with minimal orthogonal sensitivity and is highly resistant to shocks.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to include Nilsson's cantilevered accelerometer as the beam sensor described by Wu and Stemme in their ( Wu and Stemme's ) devices to obtain a beam sensor that is small, very sensitive but with minimal orthogonal sensitivity and is highly resistant to shocks. ( Nilsson col. 1 lines 45 to 52).

***Response to Arguments***

Applicant's arguments filed on 08/16/2006 have been fully considered but they are not persuasive for the following reasons :

Applicants' first contention "Applicant submits that support for the phrase "placing only a single strain compensated p+ later" is supported by the specification (pg. 9, lines 7-25) - "[A] lightly doped wafer 11 has p+ layer 17 formed on side 13... Etching takes place, as seen in Fig. 1d, until it reaches the p+ later 17." Only a single p+ layer is shown and described for use as the etch stop. Fig. 3 also shows two etch stops 17, 18 - one on each side of the wafer 11. Applicant submits that the etch stop still only consists of a single p+ layer 17 or 18, but not more than one.

Lines 14-16 refers to p+ layers. This is not referring to what is shown and described in Fig. 1, but is referring to how one should use these p+ etch stop layers in future applications.

The specification on pg. 8, lines 6-16 makes reference to the first embodiment for the inventions shown in Figs. 1-3. Applicant submits that this first embodiment refers to the structure of the etch stop layer and not the quantity of etch stop layers. Pg. 8, lines 18-28 refers to a second embodiment that refers to the use of an epitaxially layer 23 on the p+ layer 17 in various sensors and accelerometers (Figs. 4-6; pg. 11, lines 1-11). The first

embodiment refers to using only the p+ layer 17 in various sensors and accelerometers, which differs from the second embodiment.

Therefore, Applicant submits that the claims comply with the written description requirement." is not persuasive for the following reasons :

a) It is not fully understood how Applicants' want the Examiner to completely ignore what they described in one part of the specification, namely relevant description of strain layer in para 013 and 0016 which state :

"Germanium is isoelectronic with silicon. Strain compensated layers as thin as one thousand angstroms and as thick as several tens of microns are contemplated. "

As is clear from the above the specification describes only "Layers" in plural and not singular, therefore the description of a single strain compensated p+ layer is not seen.

b) the conclusion that Applicants' meant plural in their specification is further confirmed by the fact that Applicants' have not used the well known indicators of alternative single/multiple etch stop layer designations in paras 013 and 016 example layer/s .

It is also convention when referring to alternative single/multiple etch stop layer designations to use layer(s) as shown in the newly cited U.S. Patent No. 5906706, Robinson et al. ( herein after Robinson)

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Further, assuming arguendo that Applicants' are some how able to overcome the new matter rejection, the use of alternative single/multiple etch stop layers is conventional and well known in the art , as at least seen from the presently cited patent. ( Robinson 5,906,706).

Therefore , all of Applicants' arguments w.r.t claim 19 are not persuasive .

Applicants' state that claims 20-21 were allegedly allowable because of their dependency upon allegedly allowable claim 19, however as seen above claim 19 is not allowable therefore dependent claims 20-21 are also not allowable.

Applicants' argue that claims 22 and 24-27 and claim 23 rejected under 103 over Wu in view Stemme and Wu in view of Stemme and Nelson respectively are allowable because allegedly Stemme and Nelson do not overcome the deficiency of Stemme or Nelson.

However as shown above ( the alternative use of single/multiple etch stop layers is conventional and well known in the art , as at least seen from the presently cited patent 5,906,706, Robinson et al. ).

Therefore Wu teaches/suggests all presently recited limitations of claim 19 and there are no deficiencies left for Stemme and/or Nelson to over come.

Therefore claims 22, 24-27 and 23 are also finally rejected.

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven H. Rao whose telephone number is (571) 272-1718. The examiner can normally be reached on 8.30-5.30.

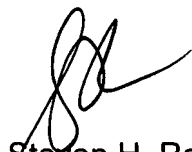
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on 571-272-1714. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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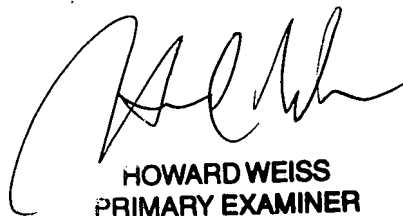
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Steven H. Rao

Patent Examiner

May 02, 2007.



HOWARD WEISS  
PRIMARY EXAMINER